The C&O Canal Extension Westward from Cumberland

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The C&O Canal set out in 1828 from Georgetown, near Washington, D.C., headed to the Ohio River. It replaced the efforts of the earlier Potomac Company, chartered in 1785, which had sought to use the Potomac River, with improvements, as a channel of transportation. That didn't work out, and the need for a parallel slackwater canal was seen. The Potomac Canal Company surrendered its Charter to the Chesapeake & Ohio Canal Company in 1828. That Company built the canal westward, in competition with a new technology, the railroad. The Canal reached Cumberland, Maryland, in 1850, five years after the railroad.

Methods of Internal Improvement, National level transportation projects, were expensive, and creative financing and legislative maneuvering were required. The National Road Project was federally funded, with maintenance turned over to the States. The Canal and the Railroad competed not only for the same pot of money but for the same labor pool. Banks did not have the money to lend, and wouldn't do it for speculative projects. Stock subscriptions and bonds were used to raise construction funds. Later efforts actually lead to a new financial instrument, invented by the Maryland Legislature, called Preferred Stock.

The original idea, championed by George Washington, was to open up the Ohio River to the east coast. Surveys by the Potomac Company in 1828 defined a series of options for the "hard part" west of Cumberland. These were reconsidered in 1876, and found to be still valid. Not only that, but by then the railroad was occupying the routes.

Washington had surveyed these paths on many of his expeditions to the West, starting in the early 1700's. The Ohio Company needed the transportation arteries to move pioneers west, and trade goods east. Christopher Gist followed and charted the Native American paths, which were themselves migratory paths. Migratory animals choose the path of least resistance. In the era before satellite imaging, the paths over the mountains were obvious to those who looked for them.

The Potomac Company had been created in 1785 to improve the navigability of the Potomac River. George Washington was the first president of the company. He served until he was elected President of the United States. Washington had realized the benefit to the nation of river navigation to the west, in his early surveys for Lord Fairfax, and his presence on the Braddock Expedition to Fort Duquesne. He made at least six expeditions along the Potomac from 1754 to 1784. He owned land along the way, and in Western Pennsylvania. The Potomac Company went on to build five canals around falls on the Potomac. One set was at Great Falls, on the Virginia side. With these canals around the

rough spots, the Potomac River could serve as a transportation route for most of the year. Washington also worried about the Trans-Appalachian lands. There were better connected to the North & South, than to the "United" States to the east. What was to keep them from forming their own country, and align with the Spanish, who controlled the trade of Mississippi and the Port at New Orleans?

In the long run, expenses were excessive, and revenues were insufficient. Tolls couldn't cover the operating expense, let alone the debt service. The Federal government was not providing funds for internal infrastructural improvements, and private financing was too expensive and hard to get. Washington lobbied the States of Virginia and Maryland for the funds.

One product from the era of the Potomac Company survived into the C&O Canal area. The surveys of the canal path west of Cumberland were made in 1828, and validated in the 1870's. Discussion of extending the canal to Pittsburgh continued into the 20th Century.

The Potomac Company did a survey for a waterway along the southern route in 1784. There are few good options through the steep grades of the Alleghenies, and no complete water-level route. The Congress had in 1824 authorized the President "to cause the necessary surveys, plans, and estimates to be made of the routes of such roads and canals as he may deem of national importance in a commercial or military point of view, or necessary for transportation of the public mail"

The survey of potential canal paths west by the Corps of Engineers in 1876 found the prior surveys of Col. Thomas S. Sedgwick valid. He had used the prior work of Captain William G. McNeill, Topological Engineer, under the direction of the Board of Engineers for Internal Improvement, in 1824. This extended a series of surveys by the Potomack Company. These, in turn, went back to the surveying work of Washington for Lord Fairfax, and the detailed knowledge of the terrain by the agents of the Ohio Company (Gist, Cresap, and others) The new surveys included considerations of the sources of water, the cost of construction, the time required, and the relative merits of the routes. Sedgewick relied heavily on “lessons learned” of the European, particularity the French, canal system (Graeff, *Construction des Canaux et des Chemins de Fer*, Paris, 1861). A comprehensive study was submitted by Brigadier General A. A. Humphreys, Chief of Engineers, to the Secretary of War, and submitted to the 44th Congress. The building of the western extension continued to be of interest during World War I and as part of the *New Deal* Public Works Projects. But the reality of the costs always prevailed.

The two options involved different routes which we'll call the north and the south. The North route went up Will's Creek from its junction with the Potomac, through the Narrows, and into Pennsylvania. Then it headed west up and through the mountain, and to the Castleman and Youghiogheny Rivers, then to the Monongahela River and Pittsburgh. the other route is up the Savage River to Deep Creek to the Youghiogheny River and its

junction with the Castleman River. From Georgetown to Pittsburgh, the elevation gain was 3,837 feet. This was more than what had been considered feasible up to that time..

The survey team also went to the headwaters of the Potomac at the Fairfax Stone, in order to explore an option using the Black Water fork of the Cheat River. Unfortunately, this expedition had to turn back due to excessive snowfall.

Canal Extension, Option 1

This preferred alternative followed the course of Will's Creek upstream out of Cumberland and through the Narrows, then up to Pennsylvania. Turn west, and then go up the mountain. The design guidelines were to the same parameters and dimensions as the Chesapeake & Ohio canal used in construction to Cumberland.

The Narrows passage dominates the west end of the Cumberland skyline. This valley, *the gateway to the west*, is a natural geologic feature carved by Will's Creek. The cliffs of *Lover's Leap* rise some 800 feet above Will's Creek on Will's Mountain to the North. Haystack Mountain is to the south. It has taken Wills Creek some 150 million years to wear down the rock of the Allegany mountains, up-thrust from an ancient seabed, into the two separate mountains.

The strata revealed in the rocks is interesting. It is the Juniata Formation, 530 feet thick and predominately red, dates from the Ordovician period, some 435-460 million years ago. Overlaying this is some 380 feet of the younger Tuscarora sandstone, from the Silurina period, 425-435 million years old. The strata is up-thrust at the ends, most noticeably at the west end of Wills Mountain at Locust Grove. From Haystack Mountain to Will's Mountain, the valley is about 1/2 mile across at the top of the cliffs.

How would the canal have proceeded through the Narrows? Currently, and for the past 100 years, there has been two sets of rail lines, the National Road, and Will's Creek crammed into the passage. The canal builders chose to use the creek bed. This would be a good option at all times except the spring floods. The Eckhart Branch Bridge would have had to be modified. The plan was to enclose the Creek in masonry walls and place the canal in the center. I suspect this would have lasted until the next flood.

Essentially, the canal would have followed the path of the Pittsburg (sic) and Connellsville Railroad (later, B&O). This makes sense; the railroad and the canal faced similar problems with grade and access. However, the railroads did not need the assured sources of water. The 1875 Survey started with a request from the Government Engineer, Major Merrill, to Benjamin Latrobe, Chief Engineer of the Baltimore & Ohio Railroad, for the information acquired in the surveys for the rail line. These were politely supplied. Why not? The rail line had been built. As the canal engineers found out, it was built in the best path. The canal was too late. The Board of Internal Improvements Report of 1826 reported the best route was Will's Creek to the Castleman River to the Youghiogheny River. This path was shorter than the other options, and required a lower summit tunnel. However, this optimum route had rail tracks on it in 1875 - the Pittsburg and

Connellsville Railroad. The tunnel was the Baltimore & Ohio's Sand Patch tunnel. Latrobe related that the tunnel had cost $420,000 to construct its 4,800 foot length. This gave the canal engineers a reality check on their own estimates.

"I am decidedly of the opinion that the summit-tunnel should be worked by steam."

If they eliminated the tow path, the tunnel would be less expensive, based on the French experience. Either tug boats or stationary engines and tow cables would be used to move the boats. As the railroads had found out, long tunnels worked by steam engines tended to fill up with smoke rapidly. Five tug boats were specified for use at the tunnel.

This option was considered at Paw Paw, WV, but not implemented This approach would not have allowed for two boats side-by-side, but would have allowed more water, and the boats to ride higher, thus reducing their drag. Stationary steam engines were to be used to pull the boats through. The European experience with tunnels was to collect the boats into "trains," and move them through in groups.

A major worry of the canal builders was an adequate water supply to replenish losses due to evaporation and leakage. Of course, a certain amount of water is "lost" downstream every time a load is locked through. Evaporative losses were well know. Loss due to leakage could be countered by cementing the path of the canal, an expensive proposition. The calculated figure was 42 cubic feet of water per mile, per minute. This was a bit of a problem on the eastern slope, but the engineers thought the Casselman River could handle the supply on the western slope. They assumed 150 lockage transits per day, requiring 87.5 cubic feet of water per running foot, per 24 hours. There were to be two reservoirs on the Castleman River above Salisbury, PA.

There was a trade-off at the top of the mountain, between continuing the lift system (locks or inclined planes) to the summit, or using a summit tunnel to lower the required lift. There were cost and time trade-offs. A summit tunnel was the chosen option. One can get canal boats up and down a mountain by several means. As long as water is available for the operation of the locks, that scheme will work. Inclined planes are another method, used at Georgetown, and on the Allegany Portage Railroad in Pennsylvania. The Georgetown Plane used a caisson, a water-filled container to hold the canal boat. This was essentially a portable lock. There are pros and cons to each approach.

Sandpatch grade is located on the B&O rail line to Pittsburgh, west of Cumberland. It features steep grades and a long railroad tunnel. The railroad tunnel at Sandpatch was begun in 1854, and opened in 1871. It was single-tracked, and 4,777 feet long. In 1911, a new tunnel was begun. Only 4,475 feet long, but double-tracked, it was opened in 1913. The canal would have also needed a tunnel, deeper and longer. Where the tunnel was built also affected its length. Closer to the top of the mountain, the tunnel would have been shorter, but more locks or inclined planes would have been needed to reach it.

The summit tunnel, based on the survey of 1826, was located at an elevation of 1,972 feet. This was modified to be some 28 feet lower. This would have had the effect of requiring

a shorter feeder tunnel from the reservoir. The proposed tunnel was larger (28 feet high, 46 feet wide) than any then currently in use. It was designed to allow 2-way traffic, which was thought to be essential.
From Cumberland to the summit tunnel there would have been 17 inclined planes, for a total lift of 1,185 feet. This eliminated the need for 148 additional locks. The western slope was more gradual, with six planes, and fifty-six locks. The plan was to go up the Youghiogheny River as far as Connellsville, then head up river to West Newton. This slackwater option was appealing. Some dams and locks would be required. The eastern slope would have also required 5 aqueducts, with 6 more on the western slope.

The shipment of coal, coke, and iron ore from Connellsville to Pittsburgh was also mentioned. The accommodation of the type of river barge used on the Ohio (125 feet long, 25-30 feet wide) to Connellsville was also factored in. The question of importance was, what would be the motive power for the large barges? It was not clear at the time whether steam power would ever replace animal power.

The summit reservoir, as proposed in 1826 (the Pleucher Reservoir), would be built along with a smaller reservoir closer to the canal. These would have a combined capacity of some 250 million cubic feet of water.

The estimated cost of the canal extension from Cumberland to Pittsburgh by the Will's Creek and Youghiogheny River Route was estimated to be $25 million dollars. It had cost $15 million to get to Cumberland from Georgetown.

Canal extension, Option 2

The second option involved following the Potomac to the confluence of the Savage River, then up the Savage River to the Castleman river. From Cumberland to Westernport, and a mile or so beyond would have been easy. The route is water-level, along the Potomac River. Shortly there after, Backbone Mountain is in the way. An early design involved a long tunnel, with a feeder lake in Garrett County. The tunnel would have been longer than any attempted yet in the world. Curiously, the lake would later be built as a source of hydroelectric power, and recreational boating. It is called Deep Creek Lake, an artificial lake of 3,900 acres extent. The proposed summit reservoirs were to have a capacity of over 252 million cubic feet, and a surface area of some 200 acres.

The report mentions that, although the North Branch Route, was inferior to the Wills Creek one by having a higher summit level and a longer required tunnel. The local line extension from Cumberland to at least the confluence of Georges Creek at Westernport would be important for the coal trade. This would save 28 miles of rail transportation, but rail transportation was established by then. The section from Georges Creek to the Savage River was going to be problematical, due to existing bridges, mills, and the town of Piedmont. Senator Davis would most likely have supported this. It fit well with his West Virginia Central and Pittsburg Railroad, his Piedmont & Cumberland Railroad, Cumberland and Piedmont Railroad, Potomac & Piedmont Coal & Railroad Company, and the Bloomington & Fairfax Railroad. This extension would had added 30.5 miles to

the canal from Cumberland. The drop in elevation is 335.3 feet, requiring 43 locks. The Savage River would have been used as a feeder water supply.

This option would have a dam across the Potomac some 600 feet below the mouth of the Savage River. From the dam it was about 1/2 mile to "the Honorable H. G. Davis' sawmills." Boats would pass into the Potomac at a river lock upstream of Piedmont. The C&P Bridge crossing from Westernport to Piedmont would need to be raised or relocated. An alternative taking the canal through the center of Piedmont was considered and discarded, because of potential conflicts with the Baltimore & Ohio Railroad. The Luke Paper Mill was built in 1888. It occupied land that would have been used by the canal.

Another sub-option would have been to terminate the canal before Piedmont, and use an extension of the C&P Railroad to reach it. Lock 19 would have been the Keyser lock. Keyser, WV, once known as New Creek, was the site of major B&O yard facilities, and had a brick station. It was also the northern terminus of the Twin Mountain & Potomac Railroad, an agricultural hauler. The canal line basically follows the B&O Railroad. At Rawlings, the canal would enter and follow the river for a while. This happens again further east, where the canal would enter the river for over a mile. Lock 39 would be at Warrior Run in Maryland. From Cumberland to Georges Creek, the cost would have been almost two and a quarter million dollars. It was estimated this option would drop the cost of coal transportation to tidewater at $1.65 per ton compared to the railroads. The then-current cost of coal transportation by the railroad was $3.26 per ton for the 212 miles required.

There was actually another option, considered by McNeill in his 1824 survey. This was to continue up the Potomac and Savage River, and continue to the Youghiogheny River by means of Deep Creek. However, the Wills Creek Route was 18 miles shorter, and 440 feet lower.

We are left to wonder what the C&O Canal system would look like today if it had been completed to Pittsburgh. Actually, you can hike or bike it to take a look.

The Great Allegheny Passage from Pittsburgh to Cumberland, follows the path of one of the proposed paths. It is a hiker-biker trail that connects Pittsburgh with Washington, DC via the C&O Canal National Historic Park at Cumberland, Maryland. The trail follows the path of the old Pittsburg & Lake Erie and Western Maryland Railroad tracks that were removed in the early 1980s. It passes through McKeesport, West Newton, Connellsville, Ohiopyle, Confluence, Rockville and Meyersdale, then to Frostburg, where it follows the Western Maryland Scenic Railroad line into Cumberland. At Cumberland, the trail connects to the C&O Canal Towpath. The path is about 300 miles long, and has a maximum 2% grade, due to the use of existing canal and railroads rights-of-way. No motorized vehicles are permitted. It reaches a maximum elevation of about 2,400 feet at the Eastern Continental Divide near Deal, PA.

For further information, see the Author's book,

Stakem, Patrick H. *Tracks along the Ditch, Relationships between the C&O Canal and the Railroads*, 2012, PRRB Publishing, ASIN B008LB6VKI.

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